



An Examination of the (Un)Intended Consequences of Performance Funding in Higher Education

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Abstract

Previous studies have shown that state performance funding policies do not increase baccalaureate degree production, but higher education scholarship lacks a rigorous, quantitative analysis of the unintended consequences of performance funding. In this article, we use difference-in-differences estimation with fixed effects to evaluate performance funding in Indiana. We find that performance funding did not increase the number of graduates and instead led to declining admission rates and increased selectivity at Indiana's public universities. When compared with surrounding states, we find limited evidence that the effects of performance funding could disproportionately limit college access for Indiana's low-income and minority applicants.

Keywords

performance funding, higher education, IPEDS, government failure, policy feedback effects

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Introduction

Carrigan (2008) defined performance funding as “a manner of formula funding that pegs the level of funding to institutional performance on set indicators” (p. 65). Although many scholars have examined whether performance funding policies have increased retention or the number of graduates at American colleges and universities, there has been a lack of rigorous, quantitative analysis of the unintended consequences of performance funding policies (Dougherty et al., 2014; Hillman, Tandberg, & Fryar, 2015). The spread of performance funding across the American states has raised concerns that higher education institutions will change their admission policies to admit more students who are seen as more likely to graduate and fewer students who tend to have lower ACT or SAT scores, lower grade point averages (GPAs), and a lower likelihood to graduate (Dougherty et al., 2014). Unfortunately, these lower-achieving students are disproportionately ethnic and racial minorities or from lower income households (Pascarella & Terenzini, 2005).

Performance funding skeptics argue that by funding public higher education institutions based on the number of students they graduate, states will encourage colleges and universities to change whom they admit rather than change how they educate and support students after matriculation (Lahr et al., 2014). As a result, states could further marginalize those types of students already facing inequitable access and disproportionately low graduation rates. Given these concerns, we ask the following research questions:

Research Question 1: Do performance funding policies improve outcomes (increase the number of graduates) for Indiana’s public colleges and universities?

Research Question 2: Do performance funding policies affect admission processes by increasing selectivity (decreasing admission rates and increasing average ACT scores)?

Research Question 3: Do performance funding policies decrease enrollment rates of minority and low-income students?

To answer these research questions, we conduct a case study of Indiana’s performance-based funding program that was established in 2007. We analyze Integrated Postsecondary Education Data System (IPEDS) data from colleges and universities in Indiana and several comparison states. We are able to increase the internal validity of our findings by using quasi-experimental difference-in-differences estimation with year fixed effects and institutional fixed effects. Our findings will be particularly useful for state policymakers who are considering whether to implement or amend performance funding

formulas and the higher education practitioners forced to respond to these policies. The next generation of performance funding policies will be hard-pressed to balance the competing imperatives of allocating scarce public resources and preserving—or improving—access to and equity in higher education, particularly as colleges and universities face increasing pressure to do more with less (Kirst & Stevens, 2015). This study provides evidence that well-intentioned state policies may actually exacerbate some of the challenges facing public higher education.

Performance Funding in U.S. Higher Education

States have adopted several types of performance management policies to increase accountability and improve higher education outcomes, including performance-based funding, performance budgeting, and performance reporting. Performance funding programs use set formulas to determine annual allocations based on institutional outcomes along several metrics, such as retention or number of graduates. Performance funding is distinct from performance budgeting and performance reporting. Performance budgeting allows state officials to consider campus achievement and use their discretion when making appropriations. Performance budgeting, however, requires colleges and universities to report information on student outcomes to the public without affecting state funding (Burke & Minassians, 2003; McLendon, Hearn, & Deaton, 2006; Volkwein & Tandberg, 2008). As state budgets have become increasingly strapped, all three policy innovations have spread across the United States. Thus, colleges and universities have been pressured to compete and justify their use of public monies (Tandberg, 2010).

Performance funding in U.S. higher education has been characterized by the following three trends: (a) its rapid adoption across states, (b) larger percentages of funding are determined by performance funding formulas, and (c) a shift from using performance funding as supplemental awards to using it to calculate base allocations. Since 1979, 30 states have adopted performance funding policies (Dougherty et al., 2014). States with Republican legislatures and states with more centralized systems of higher education governance have been more likely to adopt performance funding policies (McLendon et al., 2006). In recent years, a variety of philanthropic and government groups have encouraged state policymakers to adopt performance-based funding policies and raise the stakes of these policies over time. Advocates of performance funding include the Bill and Melinda Gates Foundation and the Lumina Foundation (Blankenberger & Phillips, 2014; Hall, 2011; Mangan, 2013; Scott, 2013; Stokes, 2012; Troop, 2014), the National Governors Association (2010), and the National Conference of

State Legislatures (NCSL; 2015). Supporters have justified these policies by arguing that performance funding policies can help meet President Obama's goal for the United States to have the highest proportion of college graduates by 2020 (Bogue & Johnson, 2010; Cavanaugh & Garland, 2012; Harnisch, 2011; Walters, 2012).

When Tennessee pioneered performance funding in the late 1970s, only 2% of the budgets of colleges and universities in Tennessee were determined by performance metrics (Bogue & Johnson, 2010; Dougherty & Natow, 2010). Although many states continue to use performance funding to allocate relatively small percentages of higher education funding, some states now allocate much larger percentages of funding using performance metrics (Dougherty & Reddy, 2013). For example, by fiscal year 2015, Ohio allocated 100% of its state funding to community colleges based on performance funding formulas (Dougherty et al., 2014). Moreover, states have historically used performance-based funding to award supplements to institutions' base allocations; that is, colleges and universities were awarded additional (bonus) funds when they showed improvement along a certain set of outcomes, such as increasing their total number of graduates. More recently, states, such as Indiana, have stopped using performance-based funding to award windfalls and instead use performance metrics to determine annual appropriations. The changing paradigm from using metrics to award bonuses to using metrics to calculate base allocations has come to be described as the shift from performance funding 1.0 to performance funding 2.0 (Blankenberger & Phillips, 2014; Dougherty & Reddy, 2013).

The Effects of Performance Funding Policies on Student Outcomes

Multiple quantitative studies have found that performance funding policies are not significantly related to improvements in the number of degrees awarded (Hillman et al., 2015¹; Hillman, Tandberg, & Gross, 2014; Rutherford & Rabovsky, 2014; Sanford & Hunter, 2011; Shin, 2010; Shin & Milton, 2004; Tandberg & Hillman, 2014; Tandberg, Hillman, & Barakat, 2014; Volkwein & Tandberg, 2008). Several of these studies have tested for effects of the policies on the state-level number of graduates from public 4-year colleges and universities (Volkwein & Tandberg, 2008) and community colleges (Tandberg et al., 2014); these studies have generally found that states with performance-based funding do not exhibit increases in the number of degree completions to a greater extent than comparable states without performance funding. Other studies have examined colleges and universities as units of analysis to find that numbers of graduates are not significantly related to performance funding

policies (Sanford & Hunter, 2011; Shin, 2010; Shin & Milton, 2004). Hillman et al. (2014) compared Pennsylvania's public 4-year colleges and universities with those in neighboring states as well as a national sample. They then used quasi-experimental matching procedures to create a group of comparison colleges with similar institutional characteristics (e.g., percentage of undergraduates who were racial or ethnic minorities). Across each of their comparison groups, public colleges that operated under performance funding regimes did not have better student outcomes (Hillman et al., 2014).

Some studies have even found evidence that the number of graduates may actually *decline* in states with performance funding policies (Rutherford & Rabovsky, 2014; Tandberg et al., 2014). Tandberg et al. (2014) found that treatment effects were not always consistent during the period of study as some performance funding states had worse outcomes while others did not. Some researchers have found significant and counterintuitive effects by extending the period of study. For example, Rutherford and Rabovsky (2014) examined 500 institutions across all 50 states over a period of 18 years and found that graduation rates decline in performance funding states. Conversely, Tandberg and Hillman (2014) concluded that the effects of performance funding policies are insignificant in their early years, but positive and significant effects are observed, beginning in the seventh year of implementation. Given these mixed findings, it is not surprising that several studies have called for additional quantitative research that uses multiple control variables to examine effects on the number of graduates and student outcomes (Dougherty et al., 2014; Dougherty & Reddy, 2013).

(Un)Intended Effects of Performance Funding Policies on College Access and Admissions

Performance funding policies may be asking institutions to improve outcomes that are largely predicted by backgrounds and experiences that occur before students even set foot on college campuses. Zhang (2009) argued that graduation rates are not the best measure of institutional performance because much of the variance in estimating completion is explained by students' background characteristics, regardless of the institutions they attend. Survey data show that campus administrators, faculty, and staff who are responsible for creating performance funding reports know that "student retention is influenced in part by personal and economic factors that institutions cannot control" (Banta, Rudolph, Van Dyke, & Fisher, 1996, p. 36). If higher education professionals are aware that they are being judged on metrics that are largely out of their control, then college and university administrators may try to comply with the letter but not the spirit of performance funding laws.

While institutions cannot control students' personal backgrounds or economic circumstances, they can control whom they admit. In fact, faculty and administrators who worked at colleges and universities in several states have expressed concern that performance funding policies have already led, or will lead, to several unintended consequences, including more restricted admissions (Colbeck, 2002; Lahr et al., 2014). Hillman et al. (2014) noted that graduation rates "can easily be gamed and manipulated at the campus level" because "a campus could increase its graduation rate by admitting students who are most likely to graduate even if this means shrinking the size of the incoming freshman class" (p. 835). Colbeck (2002) found that a Tennessee university sought to maximize its performance funding award by limiting enrollment "to preserve better student/faculty ratios and to better ensure a quality education for its students" (p. 16). This was particularly surprising because the campus could have received more money for admitting additional students through an alternative enrollment-based funding formula (Colbeck, 2002).

If public higher education institutions are responding to performance funding policies by admitting fewer but more qualified students, researchers should be able to find evidence of the unintended consequences through admissions data. The process of gaming admissions—in terms of changing both the number and perceived quality of entering students—has been referred to as "creaming" in previous literature (Dougherty & Reddy, 2013). Qualitative studies suggest that decreased access results from raising admissions standards, such as grade point averages (GPAs) and standardized test scores (Lahr et al., 2014). For example, Dougherty et al. (2014) interviewed a senior administrator at a public Indiana university who stated that the institution was "less likely to offer admission to 'weaker' students 'because if they are weaker . . . there is a chance they will bring down your performance numbers'" (p. 27). Although this may make logical sense within the organization, this should raise some concern for a society that continues to value college access for underrepresented or "weaker" students (Dougherty et al., 2014).

In addition, higher education institutions may restrict admissions by focusing their recruitment efforts on attracting students who are perceived as more likely to graduate instead of recruiting a more diverse applicant pool that might include students viewed as less likely to graduate. Finally, need-based financial aid typically awarded to students of lower socioeconomic status could be reallocated as merit-based financial aid, which tends to be awarded to students of higher socioeconomic backgrounds (Dougherty et al., 2014; Lahr et al., 2014). Each of these efforts would limit admission rates of groups of students who have been shown to be less likely to graduate and

increase admission rates of students who are more likely to graduate, regardless of institutional resources (Pascarella & Terenzini, 2005). By gaming admissions, institutional leaders may try to improve graduation rates or increase the number of graduates without necessarily changing how they operate.

It is worth noting that some states have incorporated metrics in their performance funding formulas to reward colleges and universities for helping nontraditional students who complete certificate and degree programs. For example, Tennessee community colleges have implemented incentives to graduate low-income students and adult learners. Similarly, Florida colleges and universities increased certificate and degree completions among poorer students, students on public assistance, disabled students, and students for whom English was a second language (Dougherty & Reddy, 2013). Still, it was by studying the implementation of performance-based funding policies in Tennessee and Florida that researchers first found evidence of “creaming” and unintended consequences (Banta et al., 1996; Colbeck, 2002; Dougherty & Reddy, 2013).

Theories of Policy Analysis and Distributional Inequality

Political science literature has been underutilized in higher education research, but it is especially pertinent to studies of performance funding and accountability (McLendon, 2003); therefore, we draw on political science theories and studies of policy analysis to inform our analysis. In this section, we examine how government policies or interventions may lead to distributional inequity. These unintended consequences are conceptualized as non-market or government failures (Le Grand, 1991; Wolf, 1979) and are considered in terms of their potential to create policy feedback—also called “feed-forward”—effects (Mettler, 2002; Moynihan, 2009; Schneider & Sidney, 2009; Wichowsky & Moynihan, 2008).

Performance Management, Policy Analysis, and Distributional Inequality

The idea of pegging a college or university’s funding to how it performs on a number of metrics fits a broader pattern of performance management in the United States. Performance management appears to be an essential component of state budgeting policies that aim to increase accountability, decrease spending, and improve efficiency. However, performance management policies have been found to create a “performance paradox”

resulting in unintended consequences (van Thiel & Leeuw, 2002). For example, as the federal government has devolved administration of public welfare programs to the states, state governments have adopted their own administrative processes to cut waste, fraud, and abuse.

State performance management policies have led bureaucrats to enforce cumbersome eligibility standards for awarding Temporary Assistance for Needy Families (TANF). When states administer programs such as TANF, there are significant differences in the rates of claims that are awarded across states and counties. Fording, Soss, and Schram (2007) found that individuals with less education and income were more likely to be sanctioned by TANF caseworkers. Among TANF participants who received benefits for 9 consecutive months, Black clients were between 22% and 35% more likely to be sanctioned than White beneficiaries (Fording et al., 2007). Far too often, when performance management policies are adopted, poor and minority clients disproportionately suffer (Fording et al., 2007; Kim & Fording, 2010). Studies of TANF demonstrate a broader pattern of unintended consequences that are related to performance management policies. Governments at various levels have turned to performance management in an era of limited tax revenue, but performance management has been found to negatively affect the most vulnerable in American society.

In her study of the federal Job Training Partnership Act, Heinrich (2002) found that managers encounter several challenges when they are tasked with using performance data to deliver services. According to Heinrich, managers often value both equity and efficiency, but performance management policies tend to focus on single indicators. Although governments often seek to increase accountability and efficiency, performance management systems do not include adequate oversight to “identify and account for the . . . performance gaming activities that sometimes arise in response to divergent incentives” (Heinrich, 2002, p. 721). The same challenges that face state policymakers and bureaucrats in delivering social services likely apply to the provision of higher education. States try to use performance-based funding to maximize scarce dollars, but the performance metrics would appear to value efficiency over equity.

Theories of Nonmarket or Government Failure

The original rationale for state intervention in the higher education sector was to increase provision of an underproduced good or service that benefits society (i.e., generates positive externalities). While this rationale prevails, the policy mechanisms for achieving it have changed. Previously, states accomplished this goal by increasing spending to open new colleges and universities or by

providing financial aid and subsidizing the costs of postsecondary education. However, states have increasingly adopted performance management policies to increase accountability and efficiency—to get more for less (McLendon et al., 2006). Nearly all extant literature (cited above) has found that performance funding policies do not increase numbers of college graduates; thus, these policies are generally failing to achieve their own explicitly stated goals (but see Tandberg & Hillman, 2014 who found modest positive effects on baccalaureate degree production). Government interventions also appear to be failing by another standard, namely, the provision of equal access to higher education (Colbeck, 2002; Dougherty et al., 2014).

Wolf (1979) outlined a framework for evaluating government interventions and their effects on distributional equity. Education is a quasi-public good that states support to improve economic competitiveness, train good citizens, and create a more equitable society, but the social value of these potential benefits is hard to measure. Hence, policymakers resort to proxies of costs (dollars invested in higher education) and benefits, such as number of degrees produced. Wolf argued that legislators adopt new state policies or interventions because they live by short-term election cycles and can claim credit for identifying and solving problems without being held accountable for the long-term implementation of their own policies.

Wolf (1979) proposed that short-term legislative fixes lead to troubling results:

Government intervention to correct market failure may generate unanticipated side effects, often in areas remote from that in which the public policy was intended to operate. Indeed, there is a high likelihood of such derived externalities, because government tends to operate through large organizations using blunt instruments whose consequences are both far reaching and difficult to forecast. (p. 126)

Although states can provide colleges and universities with incentives for graduating more students, these policies still represent “blunt instruments” that do not reward faculty and staff for their work. Moreover, state policies fail to acknowledge that college and university employees are strongly motivated by prosocial values or the “perceived social impact of their work” (Moynihan, Pandey, & Wright, 2012, p. 478).

Wolf (1979) also acknowledged that various constituency groups have different levels of power they can use to influence government interventions. When public pressure builds for government action, new legislation tends to be written in ways that benefit well-organized constituencies or interest groups. In turn, this creates “a distributional inequity from the standpoint of

nonbenefiting groups occurs, even though they may have acknowledged the existence of a market failure and the legitimacy of nonmarket intervention in the first place” (p. 130). When performance funding policies are adopted, they—by design—focus reporting and assessment on student outcomes and not on whether colleges are providing equitable access to higher education. In the case of higher education, distributional inequities may be exacerbated by the “absence of a reliable feedback process to monitor agency performance” (Wolf, 1979, p. 130). Le Grand (1991) built on Wolf’s work to develop his own treatise on government failure. In his description of government failure, Le Grand (1991) wrote, “Whether a particular form of government intervention creates more inefficiency or more inequity than if that intervention had not taken place is ultimately an empirical question” (p. 442). If rigorous empirical study finds that a performance funding policy does not improve efficiency and instead creates more inequity by restricting college access, the effects of the policy may be described as government failure.

Performance-Based Funding and Potential Feedback Effects

If performance funding policies are found to warp college admission processes and restrict college access for less-advantaged applicants, then performance funding policies could ultimately lead to policy feedback effects (Mettler, 2002; Moynihan, 2009; Schneider & Sidney, 2009; Wichowsky & Moynihan, 2008). Mettler (2002) argued that citizens are affected by their interactions with government services, and public policies have resource effects as well as interpretive effects. In other words, public provision of services shapes individual behavior and changes who benefits from state services (resource effects). The types of services that states provide—and who benefits from those services—send implicit messages or cues to the citizenry (interpretive effects). Thus, restricting higher education admissions is more than an issue of distributional inequity. For example, Mettler (2002) found that, through its educational provisions, the Servicemen’s Readjustment Act of 1944 (G.I. Bill) “may have had, through both resource and interpretive effects, a pronounced impact on individuals from less advantaged groups that, in turn, affected their participation dramatically” (p. 354). Educational studies would concur with Mettler’s finding that the least advantaged among us are the ones who would benefit most from higher education (see, for example, Brand & Xie, 2010).

What Mettler (2002) referred to as “policy feedback effects” are also referred to as “feed-forward effects” (Schneider & Sidney, 2009). The term “feed-forward” may be more appropriate because “policy changes the dynamics of future political action” and “new policies create new politics”

(Schneider & Sidney, 2009, p. 108, referring to Schattschneider, 1960). Schneider and Sidney (2009) noted that policy that restricts access to higher education “thwarts greater equality in political voice” (p. 110). Drawing on work by Mettler (2002) and Schneider and Sidney (2009), we conclude that by changing college and university admissions, a state’s performance funding policy would change which types of students access and benefit from state resources. In time, these effects would likely create additional policy feedback effects by altering the political participation and engagement of the citizenry.

This study is important because it examines whether performance funding policies are susceptible to government failure. Drawing on higher education literature, we acknowledge that performance funding policies generally fail to achieve their aims of increasing numbers of college graduates. Acknowledging political science and policy analysis literature, we instead expect that performance funding policies may result in unintended consequences. In the sections that follow, we outline our analytic strategy and primary findings related to whether performance funding policies exacerbate distributional inequity and generate the potential for policy feed-forward effects.

Case Study Context: Performance-Based Funding in Indiana

According to the Indiana Commission for Higher Education (ICHE; 2015a), Indiana used its first performance funding metric in 2003 when it allocated 1% to 1.6% of state funding based on institutional research expenditures. However, it was not until 2007 that Indiana implemented a performance funding 2.0 model that based a portion of its funding on the outputs of higher education institutions. Prior to 2007, a majority of the state funding was allocated based on enrollments with adjustments for inflation, plant expansion, equity adjustments, and program quality adjustments. The primary driver of state expenditures to colleges and universities in Indiana before the implementation of the current performance funding model was enrollments, which incentivized institutions to grow their enrollment numbers. This policy was problematic for those institutions with relatively high enrollments as they had little room to gain additional state funds. In 2003, Indiana began to reward institutions based on the net change in research expenditures, representing approximately 1% of state higher education funds in 2005.

After implementing the research incentive, Indiana began investigating additional performance metrics that would be “applicable to all institutions and focus on the state’s priorities and goals for the institutions” (ICHE, 2015a). Rather than using a top-down approach of legislation, the state of

Indiana worked with their public higher education institutions to create the metrics for resident² students, adding change in the number of degrees, on-time graduation rate, and a 2-year transfer incentive in addition to the research support incentive. The metrics use only resident students in an effort to reward institutions for educating residents of Indiana. Because the change in number of degrees was averaged across a 3-year period to ensure stability, the first performance-based funds were provided to institutions in 2009, totaling 2.5% of the state's higher education budget.

In 2009, several adjustments were made to the performance funding model in Indiana (Indiana Commission for Higher Education, 2014). Incentives for low-income degree completion and workforce development were added. In addition, Indiana began allocating state higher education funding based on the number of successfully completed credit hours rather than credit hours enrolled, which was immediately added to the metrics for 2010 funds. By 2011, Indiana lowered the amount of performance-based funds to only 1.6%, but the state reinvested in its performance-based model in 2012 by allocating approximately 5% of the state higher education budget to performance funding. This percentage grew to 7% by 2015, but that time period is not covered within this study.

In terms of how Indiana's performance-based funds were allocated between the different metrics, approximately 50% of the performance funding was allocated on the basis of change in degrees as of 2011. Successfully completed credit hours and research incentive funding each accounted for approximately 20.5% and 20.2% of the state's higher education funding, respectively. Finally, dual credit successful completion (2.6%), low-income degree change (4%), on-time degree change (2%), and early college successful completion (0.8%) accounted for the remaining performance-based funds (Indiana Commission for Higher Education, 2015b). Indiana was chosen as the sole state to examine performance-based funding for several reasons. First, no study has examined Indiana to date, while numerous studies have examined other U.S. states, such as Pennsylvania (Hillman et al., 2014), Tennessee (Banta et al., 1996; Sanford & Hunter, 2011), and Washington (Hillman et al., 2015). Second, Indiana has been noted as a leader in performance-based funding by several higher education organizations and nonprofit groups, such as the New England Board of Higher Education, Center for American Progress, National Center for Higher Education Management Systems, and Complete College America (Crellin, Aaron, Mabe, & Wilk, 2011; Indiana Commission for Higher Education, 2015b; Jones, 2013; Miao, 2012). Third, the implementation of performance-based funding in 2007 provides ample data from Indiana and several comparison groups that did not use performance funding during the same

time frame. Given the number of U.S. states that have started, stopped, and reimplemented performance funding models in recent years, any attempt to construct a data set that allowed for a difference-in-differences approach for multiple states would have been highly problematic.

Data and Method

Our study utilizes data from the IPEDS and labor market variables from the Bureau of Labor Statistics (BLS). IPEDS is an annual institutional survey of all higher education institutions that provides federal financial aid to their students. These data include variables related to each institution's characteristics, enrollment, graduation, and financial information. The sample used for this study included only 4-year institutions from Indiana and three comparison groups. As the effect of performance funding was the primary purpose of this study, 14 public, 4-year institutions from Indiana were included in our reference group. The first comparison group contained public institutions from three states similar to Indiana based on demographics, unemployment, and average income across the state. This group included 29 public, 4-year institutions from Kentucky, Missouri, and Wisconsin. The second comparison group included 21 private institutions within the state of Indiana. The third comparison group included 55 institutions from six surrounding states that did not have performance funding between 2003 and 2012, including Iowa, Illinois, Kentucky, Missouri, Minnesota, and Wisconsin. Overall, our analyses included 90 four-year institutions over a 10-year period of time. Community colleges and any 4-year institutions that had open access for any year during the specified time frame were removed from the sample because they do not submit data to IPEDS regarding entrance test scores or admission rates, which are two important components of this study.

States included in comparison groups were screened for performance-based funding between 2003 and 2012 using a variety of sources. A policy brief by Tandberg and Hillman (2013), which examined states between 1990 and 2010, and the website of the NCSL (2015), which compiles a list of current and transition performance funding programs, were the basis to determine which states have or had performance-based funding models. Nebraska has never had a performance funding model, while Wisconsin and Iowa have implemented their first performance funding models in 2014 and 2015, respectively. Illinois had a performance funding model from 1998 to 2002 (Burke & Minassians, 2003) and enacted a new performance funding model as of the 2013 fiscal year (NCSL, 2015). Kentucky and Minnesota had performance funding models in the 1990s that ended in 1997 and 1999, respectively (Burke & Minassians, 2003). Missouri has had a program called

Funding for Results in place since 1996 (Coordinating Board of Missouri Department of Higher Education, 2012), which provides excess funds to institutions and programs in the form of grants for emerging programs, which must go through an application process. As this program does not fund based on metrics commonly found in other funding models, we did not consider this a traditional performance funding model. Beginning in 2014, Missouri will begin a formal performance funding formula that is similar to other states (NCSL, 2015), but our analysis only includes data up to 2012. Several other surrounding states, notably Ohio, Tennessee, and Michigan, were not included because they had performance funding models during the time frame examined within our study (NCSL, 2015; Tandberg & Hillman, 2013).

Variables

Given that institutions could respond to a performance funding policy in several ways, we chose to model three types of dependent variables: outcomes, student diversity, and student quality. To measure outcomes, we examined the total number of graduates per year at each institution. This is the outcome that receives the largest weight in Indiana's performance funding model. Student diversity was measured by the change in full-time equivalent (FTE) minority enrollment in the entering class and the change in number of students in each entering class who received a federal grant,³ which is the measure by which we operationalized as an indicator of low-income students. Finally, student quality was measured by the 25th and 75th percentiles of ACT scores⁴ and the admission rate of the university.

Year fixed effects and institutional fixed effects were used to account for differences that do not vary by year or institution, such as institution type, national policy changes, economic shocks including the Great Recession, and other unobserved time-invariant variables. Control variables measured several factors that vary by year and institution, including the FTE enrollment for the entering class in each year, state-level unemployment, and state appropriations, except for the comparison group of private institutions, which does not include institutions that would receive appropriations. As the control variables vary by time and institution, they add meaningful information to the model beyond the fixed effects.

Analytic Strategy

This study employs a difference-in-differences strategy that compares several outcomes before and after implementation of performance funding in the state of Indiana. This strategy also adjusts for factors, such as labor market

conditions and state demographics. Difference-in-differences approach has become increasingly popular to examine the impact of policy changes on education outcomes (Flores, 2010; Garces, 2012) and is suited for estimating the impact of performance funding on the change in number of graduates at institutions in Indiana. This quasi-experimental method is limited in supporting causal claims, but it is preferred as true randomized experiments cannot be ethically conducted to answer the outlined research questions for this study. The addition of institutional fixed effects and year fixed effects further improves the internal validity of the study. Difference-in-differences approach works by taking the difference of several outcomes at public institutions in Indiana before and after 2007, and then subtracting the difference of those same outcomes before and after 2007 for a comparison group. In doing so, we account for changes in Indiana before and after the performance funding policy was implemented and differences between public institutions in Indiana and the comparison groups, all of which did not implement performance funding during the chosen time period. In other words, we will determine whether outcomes at public higher education institutions in Indiana changed after performance funding was implemented and account for whether these changes were different than the selected comparison groups outlined previously.

Several assumptions are required by the difference-in-differences methodology, including the requirement of parallel trends between the treated and untreated groups prior to the introduction of performance funding. A common concern associated with a violation of this assumption is an Ashenfelter's (1978) dip, which describes a pretreatment dip in an outcome compared with the comparison groups. This assumption held true for all outcome variables except for the 3-year average difference in graduates with no lag, where the trend for Indiana's public institutions was downward compared with a constant or increasing trend in other states. This implies that results for the change in graduates could be influenced by a pretreatment trend. A second assumption is that no other policies that could affect dependent variables were passed at the same time as performance funding in the state of Indiana (Lechner, 2010). While no other policies were changed during the same year performance funding was implemented, the 21st Century Scholars Program, which is designed to provide free tuition to qualified students who are below a specified income threshold, underwent a change in 2011. Prior to 2011, a 2.0 high school GPA was required for the program, but the required GPA was raised to 2.5 in 2011 (Ziliak, 2011). Although this change occurred 4 years after performance funding was implemented, it could have adverse effects for all of the dependent variables operationalizing the unintended consequences of performance funding during the last 2 years of our sample.

Our final model can be described by the following equation:

$$y = \beta_0 + \beta_1 dB + \beta_2 \mathbf{X} + \delta_0 d2 + \delta_1 d2 \times dB + u,$$

where y is the dependent variable (outcomes, diversity, and quality), $d2$ is a dummy variable for the second time period, dB captures differences between the treatment and control groups prior to the change, and \mathbf{X} is a vector of all control variables. Performance funding is treated as an exogenous variable in this model, indicating that variables in the model do not affect the presence of performance funding. The time period dummy, $d2$, accounts for factors that would cause changes in average change in graduates if performance funding had not been implemented. The coefficient of interest δ_1 is an interaction term that combines the dummy variables for the time period and policy implementation, which is indicated by the following equation:

$$\hat{\delta}_1 = (\bar{y}_{B,2} - \bar{y}_{B,1}) - (\bar{y}_{A,2} - \bar{y}_{A,1}).$$

Our control variables include entering freshman class at each institution, state-level unemployment, state appropriations, year fixed effects, and institutional fixed effects. Freshman class size, state appropriations, and institutional fixed effects will account for variance between institutions, whereas state-level unemployment accounts for the economic climate across states. Year fixed effects account for within-year variations, such as the Great Recession and the significant changes in federal grant policy. The year fixed effects will also control for omitted variables that affect all institutions within a given year.

To ensure robust results, we ran specifications to examine two additional time frames between 2003 and 2012. The first compares 2003-2007 with 2008-2012 and assumes no lag between policy implementation and institutional response. The second time frame compares 2003-2006 with 2009-2012 and provides a 1-year lag. Given that performance funding based on outcomes was entirely new to the state of Indiana, some institutions could have a delayed reaction to the policy. In particular, since a 3-year average of change in graduates was used as a measure in the model, institutions were not provided funding until 2009, meaning that some institutions may not have responded until funds were attached to their actions. As a result, we will only describe regression findings for the time frame comparing 2003-2005 and 2010-2012, which uses a 2-year lag. The specifications were run for all three comparison groups, which add as a second robustness check for the data.

Limitations

There are several limitations of note due to the data and type of analysis conducted. First, we would have continued analysis past 2012 to include additional years, but this was not feasible as several of the comparison states implemented performance funding models shortly after our time period ended, including Illinois and Wisconsin in 2013 and Minnesota and Missouri in 2014. Furthermore, several surrounding and similar states, such as Michigan, Tennessee, Ohio, and Pennsylvania, could not be used because they had performance funding measures in place during the time period of our study.

Second, because we only examined performance funding in Indiana, the results may not be generalizable to other states' performance funding models. Policies across the United States have allocated different levels of higher education funding using a variety of different metrics. If other states allocate more or less funding to institutions through their performance funding policies, it could change the response of institutions. Therefore, we are cautious to assert that all performance funding policies lead to the same unintended consequences. Third, we were unable to include community colleges and open access institutions in our analyses. Open access institutions, which include public community colleges, are not required to submit data on entrance test scores or admissions data—both of which represent important variables for this study. As a result, we chose to constrict our sample to 4-year, nonopen access institutions. Ten 4-year institutions (three private and seven public) were removed for being classified as open access for at least 1 year during the period of study.

Fourth, while a 3-year rolling average of the change in number of graduates is an appropriate measure to determine whether performance-based funding has resulted in an increase in outcomes, the implementation of performance funding in Indiana in 2007 does not allow for adequate time to clearly determine whether effects on the number of graduates should be expected during the period of our study. If performance-based funding improved year-over-year retention rates, the effects on the number of graduates could be identified within a few years, but any implications of a more selective entering class may not be experienced for 4–6 years (and potentially 6–8 years when one considers the complication of using the 3-year rolling average of the number of graduates). This is a noteworthy limitation that suggests our findings may be more indicative of the short-term effects of performance-based funding in Indiana.

Finally, we chose to measure only one outcome from Indiana's performance funding model and several unintended consequences. Indiana's performance

funding model could be successful in areas other than graduating a higher number of students. We chose to focus on the change in number of graduates because this is the measure used in Indiana's model. Other unintended consequences may be present as a result of performance funding, but it would be difficult to identify every possible unintended consequence, so we focused on those that have been noted within previous literature (e.g., Dougherty et al., 2014).

Results

Table 1 provides descriptive statistics of the outcome and control variables used in the regression models, comparing Indiana's public institutions against similar states, surrounding states, and Indiana's private institutions. On average, Indiana's public institutions have lower ACT scores (both 25th and 75th percentiles) than their peer institutions within the comparison groups. With the exception of colleges and universities within Illinois and Kentucky, Indiana's public institutions had a higher percentage of minority students and federal grant recipients when compared with comparison groups. Among states included in this analysis, only Illinois and Kentucky had a higher state unemployment rate than Indiana. In addition, Figure 1 disaggregates outcome variables of interest to show how comparison group averages compare with Indiana's public institutions before and after the implementation of performance funding.

Table 2 shows results from the regression analyses by comparison group and lag. All regression models included within this study control for total enrollment, appropriations for public institutions, state-level unemployment, institutional fixed effects, and year fixed effects. In addition, all reported regression findings within this section used a 2-year lag, allowing for a delay in response on the part of institutions. Unless otherwise noted, the 1-year lag and no-lag models had identical trends and significance levels, indicating robust results. For the impact of performance funding on the 3-year average of the change in the number of college graduates, Table 2 displays negative but mostly nonsignificant differences between Indiana's public institutions and all comparison groups. Only the no-lag model comparing Indiana's public institutions with similar states revealed a significant negative result.

The average admission rate for Indiana's public institutions was significantly lower for all models and lags used to compare Indiana's public institutions with the outlined comparison groups. When compared with similar public institutions, the average admission rate for Indiana's public institutions was 12.45 percentage points lower. The average admission rate for Indiana's public institutions was 10.05 percentage points lower than Indiana's

Table 1. Means for Variables by State.

	IN	IA	IL	KY	MN	MO	NE	WI	IN private
25% ACT score	18.3	21.7	19.8	18.8	20.3	21.2	20.5	20.6	21.4
75% ACT score	23.5	26.8	24.5	24.0	25.1	26.5	26.1	24.9	26.9
Admission rate (%)	78.6	83.5	65.6	69.4	76.1	79.3	77.9	82.9	69.6
Change in number of FTE incoming minority students	11.1	15.4	23.5	8.6	4.8	13.0	12.6	6.1	2.6
Change in number of incoming students with federal grants	30.2	18.0	37.2	25.6	14.6	26.3	16.0	22.4	4.8
3-year average change in graduates	74.4	121.4	66.3	75.9	128.5	84.5	82.2	101.0	35.2
Appropriations (millions)	84.3	205.7	117.8	112.1	91.4	67.3	105.6	64.0	0.0
Unemployment rate (%)	6.9	4.8	7.4	7.4	5.5	6.7	3.9	6.1	6.9
Entering class	2,234	3,451	2,335	2,051	1,772	1,719	2,201	1,935	552
<i>n</i>	140	30	110	60	90	100	30	130	210

Note. FTE = full-time equivalent.

private institutions and 10.70 percentage points lower when compared with surrounding public institutions.

For the impact of performance funding on the average 25th percentile of ACT scores, models showed an increase at Indiana's public institutions in the 25th percentile of ACT scores by 0.73 of a point when compared with both similar states and Indiana's private institutions. The average 25th percentile of ACT scores at Indiana's public institutions increased by 0.80 of a point relative to public institutions within surrounding states. Models examining the average 75th percentile of ACT scores revealed similar findings to the 25th percentile models. Indiana's public institutions displayed an average increase in their 75th percentile ACT score of 0.72 of a point compared with similar states, 0.84 of a point compared with surrounding publics, and 0.93 of a point compared with Indiana's private institutions. Taken together, these models imply that Indiana's public institutions were admitting students with higher ACT scores after performance funding was implemented, suggesting that access could be restricted for those prospective students with lower ACT scores.

The change in the total number of minority students in the entering class of Indiana's public institutions was significantly lower after the implementation of performance funding when compared with Indiana's private institutions and

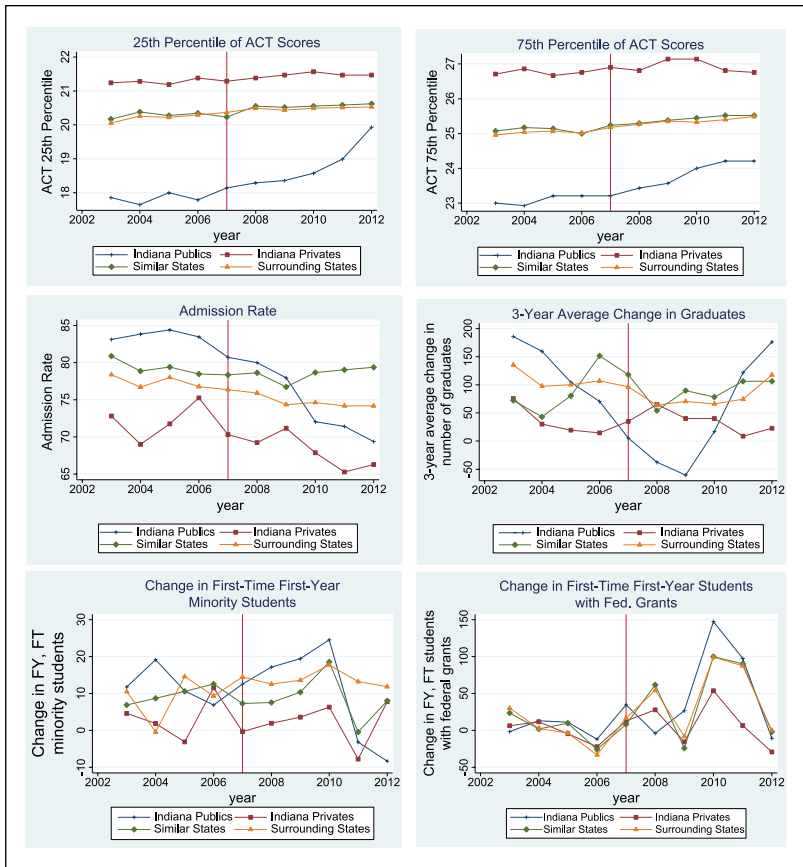


Figure I. Group averages of outcome variables before and after implementation of performance funding.

Note: FY, FT indicates First-Year, Full-Time.

public colleges and universities within surrounding states. More specifically, the total number of minorities in the entering class at Indiana's public institutions decreased by an average of roughly 19 students relative to Indiana's private institutions and slightly less than 24 students when compared with public institutions in surrounding states using a 2-year lag only. One-year and no-lag models were negative but not significant. The change in the number of students with federal grant aid was negative but not significant for the comparison group, including similar states. Indiana's public colleges and universities increased the number of students who received federal grant aid by an average

Table 2. Estimated Difference-in-Differences Coefficients by Institution and Lag.

	Private, in-state			Similar publics			Surrounding publics		
	No lag	1-year lag	2-year lag	No lag	1-year lag	2-year lag	No lag	1-year lag	2-year lag
3-year average of change in graduates	-41.64	-46.60	-24.98	-57.23 [†]	-33.40	-38.49	-35.17	-30.98	-9.01
Change in minority FTE (entering class)	-7.98	-9.11	-19.43*	-4.68	-9.09	-15.86	-11.29	-18.43 [†]	-23.92*
Change in federal grant recipients (entering class)	23.68	43.45*	46.69*	-7.62	4.49	-30.19	-15.19	-11.10	-36.91 [†]
25% ACT score (entering class)	0.55***	0.67***	0.73***	0.46***	0.70***	0.73***	0.51***	0.74***	0.80***
75% ACT score (entering class)	0.63***	0.70***	0.93***	0.43**	0.59***	0.72***	0.47***	0.69***	0.84***
Admission rate	-6.27***	-7.77***	-10.05***	-8.03***	-10.79***	-12.45***	-6.38***	-9.29***	-10.70***
<i>n</i>	370	296	222	440	352	264	700	560	420

Note. FTE = full-time equivalent.

[†]*p* < .10. **p* < .05. ***p* < .01. ****p* < .001.

of roughly 37 students in comparison with surrounding states. However, when compared with private, in-state higher education institutions, Indiana's public institutions averaged an increase of roughly 47 more students who received federal grants. This finding could be influenced by the 21st Century Scholars Program in Indiana, which provides free tuition for low-income students who meet specific requirements and attend an in-state, public college or university.

Discussion

Through the implementation of performance funding policy, Indiana sought to increase the number of graduates at its public colleges and universities. Unfortunately, Indiana's implementation of performance funding did not appear to increase the number of graduates at public higher education institutions within the state. Instead, Indiana's performance funding policy appeared to lead to decreases in the overall admission rates at non-open access

institutions when compared with private higher education institutions in Indiana and public colleges and universities in surrounding states. Declining admission rates were accompanied by increases in the average standardized test scores of admitted students. In addition, after controlling for year fixed effects, institutional fixed effects, and state-level unemployment, Indiana's performance funding policy resulted in fewer students being admitted who were racial or ethnic minorities, but the change in students with low-income backgrounds was only negative when Indiana's public colleges and universities were compared with public institutions in surrounding states.

Although Figure 1 appears to indicate that Indiana had similar trends to comparison groups in relation to its percentage of minority and Pell-recipient students, accounting for the effects of the Great Recession using year fixed effects, institutional fixed effects, and state unemployment led to a negative and significant trend for minority students in the 2-year lagged models. These findings provide evidence that supports previous qualitative studies that suggested that institutions respond to performance funding policies by "creaming" or admitting and recruiting students who are more likely to graduate (Dougherty & Reddy, 2013) as well as restricting admissions (Colbeck, 2002). These effects have gone largely unnoticed because they are not directly rewarded by states or measured by state metrics, but decreasing admission rates and higher admissions standards are unintended consequences that restrict access to public higher education (Dougherty et al., 2014; Lahr et al., 2014).

Indiana's public colleges and universities became more selective when compared with private institutions in the same state. After 2 years this significantly affected minority student enrollments. For every 100 FTE students, 20 fewer minority students were admitted at Indiana's public colleges and universities. When Indiana's public institutions were compared with those in Kentucky, Missouri, and Wisconsin—states that were determined to be similar in terms of demographics, unemployment rates, and average incomes—we found that performance funding changed Indiana's admissions climate on several indicators. The 25th and 75th percentiles of ACT scores increased significantly for students admitted to Indiana's colleges and universities. At the same time, that test scores increased, admission rates declined significantly. The third comparison group included institutions located in states that are geographically proximate to Indiana: Iowa, Illinois, Kentucky, Missouri, Minnesota, and Wisconsin. When we used this last comparison group, the admission rate for Indiana's public colleges and universities decreased and standardized test scores increased. In models that lagged covariates by 1 year and 2 years, the number of minority students who were admitted to public 4-year colleges and universities in Indiana declined substantially when compared with surrounding states. After the implementation of Indiana's performance funding law, we

found some evidence that public Indiana colleges and universities admitted fewer low-income students (those who were eligible for federal financial aid grants) than public institutions in surrounding states. Across model specifications, our results suggest that Indiana's performance funding policy was more likely to affect college admissions than the number of college graduates.

Given these empirical findings, Indiana's performance funding policy is an example of what Wolf (1979) and Le Grand (1991) identified as distributional inequity and government failure. Wolf argued that when we evaluate government policies, we should pay close attention to whether they exacerbate underlying inequities in who benefits from public goods or services—such as the provision of publicly subsidized higher education. Wolf (1979) concluded that government interventions are likely to cause unintended consequences because governments use “blunt instruments whose consequences are both far-reaching and difficult to forecast” (p. 126). Indiana's performance funding policy relied on metrics that focused on student outcomes, yet, like other states examined previously, it failed to achieve its stated goal of increasing the number of college graduates from public institutions. Instead, its effects were more visible in rising admissions standards.

College access declined at Indiana's public colleges and universities without open access, and college applicants who were racial or ethnic minorities, poorer, or less academically prepared appeared to be less likely to benefit from public higher education in Indiana than in surrounding states. In addition, the unintended effects of Indiana's performance funding policy likely created policy feedback or feed-forward effects (Mettler, 2002; Schneider & Sidney, 2009; Wichowsky & Moynihan, 2008). When groups of citizens are excluded from higher education, they not only lose direct benefits in terms of obtaining new skills and credentials, but they are also less likely to be engaged citizens. Moreover, performance funding policies, which appear to be more likely to stratify higher education than to improve it, may lead to greater cynicism toward educational policymakers and state government. Future evaluations of performance funding programs and other higher education policies should be less narrowly focused and give greater attention to unintended consequences and feedback effects associated with the implementation of these programs and policies (Mettler, 2002; Schneider & Sidney, 2009; Wichowsky & Moynihan, 2008).

Conclusion

We began this study by asking whether performance funding policies (a) improve outcomes, (b) decrease admission rates and increase selectivity, and (c) decrease enrollment of minority and low-income students. We found no

evidence to suggest that performance funding is increasing the number of graduates in Indiana in comparison with other institutions.⁵ Rather, we found that performance funding decreased admissions, increased selectivity, and may have further marginalized underrepresented minority and low-income applicants. Many of our findings were robust across multiple comparison groups and different time periods. Instead of increasing accountability or the number of college graduates, our analyses suggest that performance funding appeared to decrease access to public colleges and universities without open access in Indiana.

Many studies have examined the effect of performance funding policies on the number of graduates (Hillman et al., 2015; Hillman et al., 2014; Rutherford & Rabovsky, 2014; Sanford & Hunter, 2011; Shin, 2010; Shin & Milton, 2004; Tandberg & Hillman, 2014; Tandberg et al., 2014; Volkwein & Tandberg, 2008), however, there are a number of fruitful research opportunities related to the unintended consequence of performance funding. Because performance funding policies vary across states, use different metrics, and are implemented over several years, future research should examine the unintended consequences of performance funding policies in other states and time frames. The vast number of states that have implemented performance funding in recent years will likely make it challenging for researchers to create comparison groups, but additional studies beyond the scope of Indiana are important to fully understand the impact of performance funding on higher education institutions and students.

Our analysis was limited to unintended consequences that were easily measured and readily available, but future research could examine additional variables not captured in our study. For example, Dougherty et al. (2014) have suggested that as part of the “creaming” process, administrators may change need-based aid to merit-based aid. They also suggested that performance funding policies that award institutions for increasing their number of graduates may lead to grade inflation as faculty feel pressure to make it easier for students to pass courses and graduate. Finally, future research could examine whether the intended and unintended consequences of performance funding policies intensify or weaken over time.

Although the accountability movement may be here to stay, we caution policymakers, foundations, and higher education stakeholders to avoid viewing performance funding as a panacea for colleges and universities. Our findings are consistent with previous work that showed that performance funding policies do not improve student outcomes (Hillman et al., 2015; Hillman et al., 2014; Rutherford & Rabovsky, 2014; Sanford & Hunter, 2011; Shin, 2010; Shin & Milton, 2004; Tandberg & Hillman, 2014; Tandberg et al., 2014; Volkwein & Tandberg, 2008). Our

contribution to this growing body of literature is to provide concrete evidence that performance funding can create real, unintended consequences that can cause institutions to restrict admission rates, raise admission requirements, and limit access for minority and low-income students.

The accountability movement outlined previously is not merely about overseeing the use of public money or increasing the number of college graduates, it is also about increasing access to higher education and creating a more skilled labor force. This study suggests that performance funding policies may not necessarily improve accountability and could have negative ramifications on college access. Practitioners should be cognizant that their efforts to respond to performance funding policies and obtain additional resources could potentially exclude minority, poorer, and less-prepared students as these applicants represent the segments of our society who can benefit the most from higher education.

Although the preponderance of social science evidence shows that performance funding has not improved postsecondary outcomes, some have argued that performance funding policies *will* work if we increase the stakes. Following this line of thinking to its logical extreme, stalwart supporters of performance funding argue that states should increase the percentages of base funding that are allocated through these policies. We caution that such an approach could only amplify the pressures that are leading to the unintended consequences we identified in Indiana. Instead, we encourage policymakers to consider how prosocial values can be incorporated into performance management policies. Performance funding policies are built on implicit assumptions that colleges and universities need to be incentivized or coerced for them to try to graduate more students, but student retention is often better explained by challenges and opportunities outside of campus (Zhang, 2009). Consequently, higher education leaders may be more highly motivated by intangibles, such as the perceived social impact of their programs and policies (Moynihan et al., 2012). For higher education policymakers considering the implementation or renewal of performance-based funding in their respective states, our findings provide evidence that policies intended to increase accountability in higher education may be doing more harm than good and should be considered with great caution.

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Notes

1. Hillman, Tandberg, and Fryar (2015) found that there was an increase in the number of short-term certificates awarded by community colleges in the state of Washington.
2. The term refers to students who are Indiana state residents (Indiana Commission for Higher Education [ICHE], 2015a).
3. Earlier years of Integrated Postsecondary Education Data System (IPEDS) only reported the number of students with federal grants rather than disaggregating by types of grants, such as Pell Grants, as they do in later years. Federal grants included in this measure include need-based grants, such as Pell Grants, Supplemental Educational Opportunity Grant (SEOG) Grants, and grants for veteran students. A majority of the federal grant funds distributed are need-based, implying that this is an appropriate proxy for low-income students.
4. For institutions that did not have ACT scores, SAT scores were converted into ACT scores using a comparison chart derived by ACT, Inc., which can be found at <http://www.act.org/solutions/college-career-readiness/compare-act-sat/>
5. In fact, our estimates suggest that the number of graduates may have declined when Indiana's public colleges and universities were compared with public institutions in similar states. However, these results were not robust across comparison groups or time lags. In addition, the graduation rate figures may have been affected by an Ashenfelter's (1978) dip.

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